Logistics and Supply Chain Management in the Belt and Road Initiative: Research Opportunities and future challenges

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Abstract

Since the establishment of China's Belt and Road Initiative (BRI) in 2013, it has attracted much attention in logistics and supply chain research for its goal of improving regional and global connectivity and promoting the development of global value chains. Since previous studies were mostly limited to narrow topics such as the economic impact of the BRI on relevant countries, this study has formulated a comprehensive research framework from multiple perspectives. From the Web of Science Core Collection database, 146 articles related to logistics and supply chain under the BRI were selected for a structured literature review, and we perform a descriptive and in-depth content analysis of the research progress on logistics and supply chain construction under the BRI from a problem-oriented perspective. To promote comprehensive research on logistics and supply chain under the BRI in the future, we develop a research framework with five categories: transportation planning, sustainable development, global value chain development, infrastructure construction, and subject governance. Then, according to the logic of "why–what–how," we distinguish the advantages, obstacles, and promotional measures in the development of global logistics and supply chains based on the BRI over the past decade, and then present the following challenges: firstly, the uncertainty of international political economy has increased the difficulty of international supply chain network construction; secondly, the great power game has led to the great pressure on logistics and supply chain construction under the BRI; lastly, the accelerated evolution of the unprecedented change has led to the near-shore character of the whole supply chain. On the basis of the analysis, we then identify research opportunities for the advancement of this topic and propose future research agenda for the four focal points: subject interaction relationships, intelligence-driven, sustainability, and supply chain resilience building.

Keywords

BRI, Logistics, Supply Chain Management, Structural Literature Review

1 Introduction

The Silk Road began in ancient China 2,100 years ago as an ancient overland commercial trade route connecting Asia, Africa, and Europe. In 1877, the German geographer

Richthofen first introduced the concept of the Silk Road (Richthofen 1877) after visiting China several times, and the term was quickly accepted by academics and the general public. The ancient Silk Road, mainly composed of the Land Silk Road and the Maritime Silk Road, was a great channel for transportation, trade, and cultural exchanges between ancient China and Eurasian countries. In particular, it strongly promoted exchanges and mutual understanding between Eastern and Western civilizations and friendly relations among people. It also introduced the spirit of the Silk Road, which is based on the principles of peace and cooperation, openness and inclusiveness, and mutual learning, understanding, and benefit. At a time when the world economy is recovering slowly, development is diverging, the process of economic globalization is experiencing a countercurrent, and profound adjustments are brewing in international investment and trade patterns, China upholds the spirit of open regional cooperation and draws wisdom and strength from the spirit of the Silk Road. In 2013, it proposed the “New Silk Road Economic Belt” and the “21st Century Maritime Silk Road,” which have revitalized this ancient road, thrusting it on the world economic stage.

The year 2023 marks the 10th anniversary of the “Belt and Road Initiative” (BRI). Over the past decade, the BRI has achieved fruitful results and has attracted increasing attention from the international community and academia. The BRI is committed to the connectivity of the Asian, European, and African continents and nearby oceans, establishing and strengthening connectivity partnerships among the countries along the route and developing a wide-ranging, multilevel, and composite connectivity network. Promoting the BRI naturally requires smoother and more convenient international logistics corridors, the rapid development of international multimodal transport, expansion of modern logistics hubs, optimization of the international trade and transportation system, and enhancement of the security of the international industrial supply chain. Therefore, the BRI is closely related to the logistics and supply chain field, for which it has introduced many research problems. For example, Thürer et al. (2019) studied the factors influencing infrastructure improvement under the BRI, Wen et al. (2019) studied the risk of supply chain disruption under the BRI, Butt et al. (2020) focused on the impact of the BRI on sustainable supply chain management, Zheng et al. (2020) studied the government–market partnership under the BRI, and Uygun et al. (2021) studied the modes of cargo transportation among countries related to the Belt and Road and compared their cost differences. Over the past ten years, research on logistics and supply chain in the context of "Belt and Road" has become richer and richer, while the impact of the new coronavirus epidemic, the intensification of geopolitical conflicts, and the entry of the "Belt and Road" Initiative into a new historical node in recent years have made the research background more and more complex and diversified. The "Belt and Road" initiative

also brings great opportunities for the development of logistics and supply chain. Therefore, it is necessary to reorganize and summarize the research in the field of logistics and supply chain under the background of "Belt and Road", to obtain the current research status and research hotspots, and to summarize the future research opportunities, so as to promote the vigorous development of the field of logistics and supply chain under the background of "Belt and Road".

Under the BRI, the smooth flow of logistics and supply chains can promote trade cooperation, reduce the cost of cross-border trade, and promote interconnectivity among Belt and Road countries (Wen & Ma 2019), thereby facilitating interregional economic integration and common development. Therefore, the Belt and Road, as a sea and land channel connecting Asia, Europe, Africa, and Latin America, is bound to exert great impact on international logistics and supply chain construction. Based on the key historical node of the 10th anniversary of the BRI, the current study is motivated in two ways. First, at the theoretical level, scholars have conducted extensive research on logistics and supply chains under the BRI over the last decade, and some existing studies have focused on a structured literature review. Accordingly, the current study compares the contributions, scopes, methodologies, and main findings of these articles, and compares them with the content of this paper. Table 1 shows that past systematic reviews have employed bibliometrics (Cao & Alon et al. 2020)and text mining methods (Lee et al. 2020) and mainly focused on the impact of the BRI on the economy and politics of the relevant countries, and systematically summarize the impacts of the Belt and Road Initiative in the areas of economy, international business (Panibratov et al., 2020), transport infrastructure, multimodal transport (Lee et al., 2020), sustainable development (Bashir et al., 2021), and so on. Some studies have focused on relevant subject countries, such as Eastern European countries (Zalán&Áron 2022), China and Pakistan (Bashir et al. 2021), etc., explaining the impact of the Belt and Road Initiative on these countries and their relations, however, past studies have been conducted mostly under a narrow theme, focusing on the solution of micro-planning problems and the enhancement of economic benefits (Chan et al. 2019). Hence, comprehensive research on logistics and supply chains under the BRI is lacking, and most literature reviews do not propose systematic research agendas. Second, at the practical level, while the global cross-border flow of commodities, people and capital slowed down during the COVID-19 epidemic, and the globalization process suffered a serious setback, the "Belt and Road" cooperation has bucked the trend and continued to make new progress and new breakthroughs, demonstrating a strong resilience and broad prospects, and has become an important driving force for the continued development of globalization. After COVID-19 epidemic, the Belt and

Road Initiative, as an internationalized, high-quality and sustainable investment and trade network, can continue to make an important contribution to global economic recovery. Therefore, reorganizing the research in the field of logistics and supply chain under the Belt and Road Initiative can provide ideas for the current economic recovery. However, it should be noted that the BRI's promotion of economic globalization is still in its infancy, and the trend of the digital Silk Road has just been highlighted (Zhang et al. 2020). Therefore, urgent answers are needed with regard to promoting globalization through the BRI, building more integrated and comprehensive trade and logistics networks, and applying advanced technologies in logistics and supply chain construction under the digital economy. From these two perspectives, this study aims to comprehensively analyze the literature on logistics and supply chains under the BRI by systematically reviewing the research progress over the past decade and to propose a systematic research agenda involving integrated logistics networks and smart logistics to seize future research opportunities and challenges.

The study comprises four parts. First, by searching the Web of Science database for research papers related to the Belt and Road, this study analyzes the progress of the research into the Belt and Road in the past 10 years, focusing on the descriptions and content of existing works. Second, following the logic of "why–what–how" (Sinek, 1932), this study examines the development of global logistics and supply chains since the BRI's introduction. Specifically, we explore the need to emphasize logistics and supply chains under the BRI, the obstacles that countries may face in promoting the construction of logistics and supply chains in BRI areas, and the mainstream practices in promoting the construction of logistics and supply chains. Third, this study identifies the new trends in logistics and supply chain construction under the BRI and suggests research opportunities in the areas of intelligence-driven sustainable development and supply chain resilience and stability. Finally, we explore the agenda for research on logistics and supply chain development under the BRI.

Table 1 Comparison of extant literature review articles related to the Belt and Road

NO.	Authors	Published journal	Scope of the past studies						Primary focus	Differences
			Year span	papers reviewed	NLR	SLR	CM/CF	TC		
1	Lee,PTW，Zhang, Q，Suthiwartnarueput, K，Zhang,D Yang, ZZ(2020)	International Journal of Logistics-Research and Applications	2013-2020	388	✓				It analyzes Chinese and English articles related to logistics, supply chain, and transportation (LST) in the context of the Belt and Road through the text mining method, focusing more on the comparative analysis of Chinese and foreign scholars' researches in the field of LST, i.e., Chinese scholars pay more attention to logistics, transport infrastructure, and multimodal transport than scholars from other countries, who pay more attention to maritime transport.	This article focuses on the differences between Chinese and foreign scholars' research in the context of the Belt and Road, categorized by country. Our article, on the other hand, proposes a research framework based on the content of scholars' studies and describes future research opportunities.
2	Andrei Panibratov , Alexey Kalinin , Yugui Zhang , Liubov Ermolaeva , Vladimir Korovkin , Konstantin Nefedov ,Louisa Selivanovskikh（2020）	Eurasian Geography and Economics	2013-2020	322		✓			It provides a systematic analysis of international business, economic geography, strategic management, political economy, and other areas related to economics and management, and summarizes and proposes a future research agenda.	This article focuses on the economic and political aspects of the "Belt and Road" context. Our article also includes research on infrastructure development, sustainable development and global value chains.
3	Muhammad Farhan Bashir ， Benjiang MA，Yifang Qin，Muhammad Adnan Bashir（2021）	Environmental Science and Pollution Research	2005-2020	945		✓		✓	It systematically analyzes the research hot spots related to the Belt and Road through bibliometric methods, such as infrastructure construction, sustainable development, carbon emissions, geopolitics, and the China-Pakistan Economic Corridor.	This article is based on the perspectives of two countries, China and Pakistan, focusing on infrastructure, sustainable development, and politics in the process of cooperation between the two countries under the Belt and Road Initiative. Our article does not start with a specific country, but rather analyzes the

								subject relationship as a category in the research framework.
4	Xueqin Wang , Yiik Diew Wong , Kum Fai Yuen , Kevin X. Li（2020）	Transportation Research Part A-Policy and Practice	2007-2029	47	✓	✓	By reviewing relevant studies and technical reports, it proposes a framework for environmental governance of infrastructure construction under the BRI from the perspective of multi-actor participation.	This article focuses on the environmental governance framework in the context of the Belt and Road, based on the perspective of multi-subject participation. Our article, on the other hand, examines the relationship between sustainable development and themes as a category of research framework.
5	Chan, HK，Dai, J，Wang, XJ，Lacka, E（2019）	Transportation Research Part E-Logistics and Transportation Review	2005-2019	28	✓		It analyzes the economic benefits of the BRI, analytical methods for optimizing logistics network infrastructure projects, and empirical research on these three topics, as well as the most hungry research trends on these three topics.	This article discusses the economic benefits of the Belt and Road from a macro perspective and the optimization of infrastructure projects from a micro perspective, and conducts empirical tests. Our article, on the other hand, focuses on summarizing and classifying the previous studies and proposing future research opportunities on the basis of them, without empirical analysis.
6	Zalán Márk Maró and Áron Török（2022）	Sustainability	2014-2020	70		✓	It explains the BRI from both economic and political perspectives and focuses on the potential impact of the BRI on the economy, politics and trade of Central and Eastern European countries.	This article focuses on the economic and political aspects of the Belt and Road context, based on the perspective of the two main subjective relationships between Central and Eastern Europe. Whereas our article analyzes subject relations as a category in the research framework, it also analyzes infrastructure development, sustainable development, global value chains and transport planning.

7	Mingchun Cao and lan Alon（2020）	Sustainability	2013-2019	1583	✓			It identifies and analyzes the knowledge structure, hot spots and emerging trends of the BRI through bibliometric techniques and scientometric analysis, and proposes research gaps and future research directions.	This article identifies and analyzes the hot content and research trends in the context of "Belt and Road" and proposes future research opportunities, but does not form a systematic research framework. Our article proposes a systematic research framework based on the research articles in the past ten years.
8	This work	——	2013-2023	697&146	✓	✓	✓	This work focuses on the challenges and opportunities of promoting logistics and supply chain development under the BRI, based on a structured literature review to discuss the current state of logistics and supply chain development under the BRI, following the logic of "why-what-how". Finally, this work proposes a future research agenda.	-

NOTE: narrative literature review (NLR), systematic literature review (SLR), model/conceptual framework (CM/CF) and theoretical contribution (TC).

Based on the 10th anniversary of the Belt and Road Initiative, this paper aims to explore the advantages, obstacles and corresponding measures of global logistics and supply chain development in the context of the Belt and Road Initiative, and summarize the future research opportunities.Unlike previous review articles that focused only on one or several perspectives of economics, politics (Zalán&Áron 2022), and sustainable development (Bashir et al. 2021), this paper systematically reviews the progress of Belt and Road-related research during the past decade through a structured literature survey, with descriptive analysis and in-depth content analysis. Based on the results of the literature survey, this paper proposes a research framework comprising five categories, namely, infrastructure development, governance, transportation planning, global value chain development and sustainable development, and elaborates on each of these categories according to the logic of "why-what-how".Based on the proposed research framework, this paper finds that past research has focused on micro-level problem solving (Chan et al. 2019) and lacks macro-policy, political subject level exploration.In addition, under the Belt and Road Initiative, the rise of the digital economy and the concept of sustainable development will bring about changes in the field of logistics and supply chain (Lee&Song 2023), and the importance of supply chain security and resilience will be increasingly emphasized, which are issues that need to be studied more thoroughly in the future (Liu et al., 2023b).Based on this, this paper focuses on the future challenges: firstly, the uncertainty of the international political economy has increased the difficulty of international supply chain network construction; secondly, the great power game has led to the enormous pressure on logistics and supply chain construction under the "Belt and Road"; and lastly, the accelerated evolution of the unprecedented change has led to the supply chain presenting the characteristics of near-shoreization, which is the most important factor in the development of supply chain. Finally, based on the analysis, this paper further discusses the future research opportunities of logistics and supply chain construction under the "Belt and Road", and puts forward a future research agenda with four focuses, namely, subject interaction, wisdom-driven, sustainable development, and supply chain resilience construction.

The contributions of this study are as follows. Past research reviews have been limited to one aspect of logistics and supply chain under the BRI, mainly focusing on infrastructure development (Chan et al. 2019), sustainable development (Feng et al. 2019), transportation (Lee et al. 2020), etc. Meanwhile, the current study comprehensively analyzes the research areas related to logistics and supply chains under the BRI, and the results are expected to help scholars identify research opportunities and provide guidance for future research. While past research reviews have been limited to the perspective of one or several countries (Feng et al.

2019; Bashir et al. 2021; Jiang, 2022), the current work considers multiple perspectives from different countries and industry sectors to illustrate the logistics and supply chain construction under the BRI, thereby providing references for governments and practitioners. In addition, most existing studies have not proposed systematic research agendas (Chan et al. 2019; Lee et al. 2020; Bashir et al. 2021; Maró et al. 2022; Jiang et al. 2022). Accordingly, we propose a research agenda to tap into the research avenues that are relevant to logistics and supply chain development under the BRI.

The rest of the paper is organized as follows: Section 2 provides the details of the structured literature, including the methodology, descriptive statistical analysis, and content analysis. Section 3 presents the challenges in logistics and supply chain development under the BRI from five perspectives using the "why–what–how" logic. Section 4 proposes a broad research framework and organizes the opportunities for future research. Section 5 concludes the paper and provides management insights.The specific lines are shown in Figure 1.

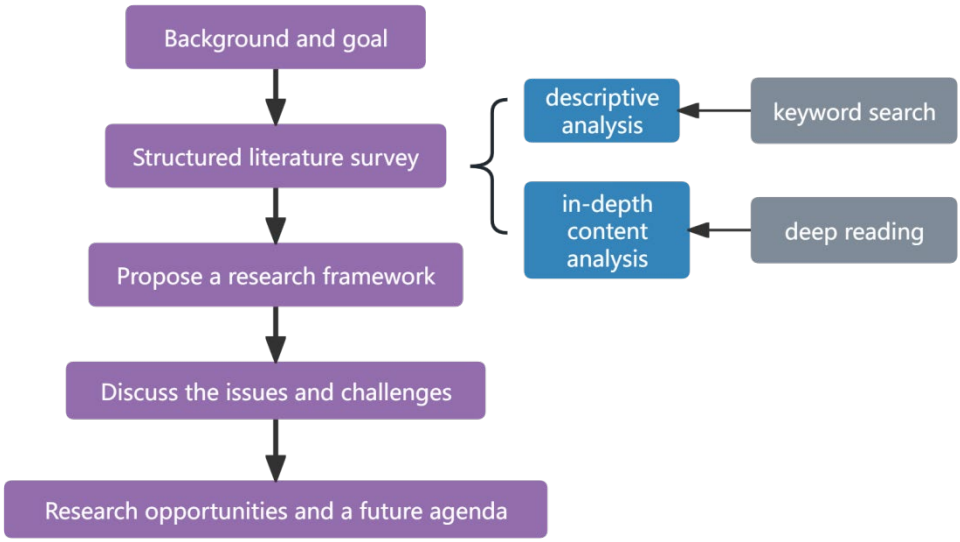


Figure 1 Writing ideas diagram

2 Research progress on the Belt and Road in 2013–2023

2.1 Research methodology

We conducted a structured literature survey to review the progress of Belt and Road research over the last decade. We referred to the iterative methodology of Denyer and Tranfield (2009) in our literature review. Specifically, in the initial phase of the literature survey, we defined appropriate search keywords for the literature collection. Our main contextual keyword was "the Belt and Road." To ensure the comprehensiveness of the search, referring to the methodology of Panibratov et al. (2020), we morphed this main keyword into various forms, including "Belt and Road Initiative," "OBOR Initiative," (Bashir et al. 2021)

"silk road, "bri, "B&R," "Economic Silk Road," "the Belt and Road Initiative," "Economic Silk Road," "Silk Road Economic Belt," "maritime silk road," "maritime silk road," and "polar silk road," and used them as search terms. Given our focus on logistics and supply chain, we added keywords such as "transport," "supply chains," and "logistics" and their various forms to ensure the relevance of the search (Wang et al. 2020). Given that the "the Belt and Road" concept was introduced by President Xi Jinping in 2013, we took 2013 as the starting point for exploring the literature in the last decade.

In the second phase of the literature survey, we conducted a positional study. As the quality of a literature review depends greatly on the data sources chosen, we decided to use the most commonly utilized literature database, the Web of Science (WOS) Core Collection.

In the screening and evaluation in the third phase, we determined the screening criteria for the article retrieval. Given our research scope, we first considered journals that explicitly focus on logistics and supply chain management issues. Logistics and supply chain issues in the context of the Belt and Road are known to involve the fields of business and economics, operations management, and transportation. Meanwhile, the WOS database categorizes journals according to research scope. Therefore, we included journals labeled as "Business Economics," "Transportation," and "Operations Research and Management Science." In the article selection, we excluded letters, editorial reviews, conference papers, and non-English articles. Finally, for the fourth and fifth phases of the literature survey, we performed descriptive statistical analysis and in-depth content evaluation, respectively. The details of the five-step iteration process are shown in Figure 2.

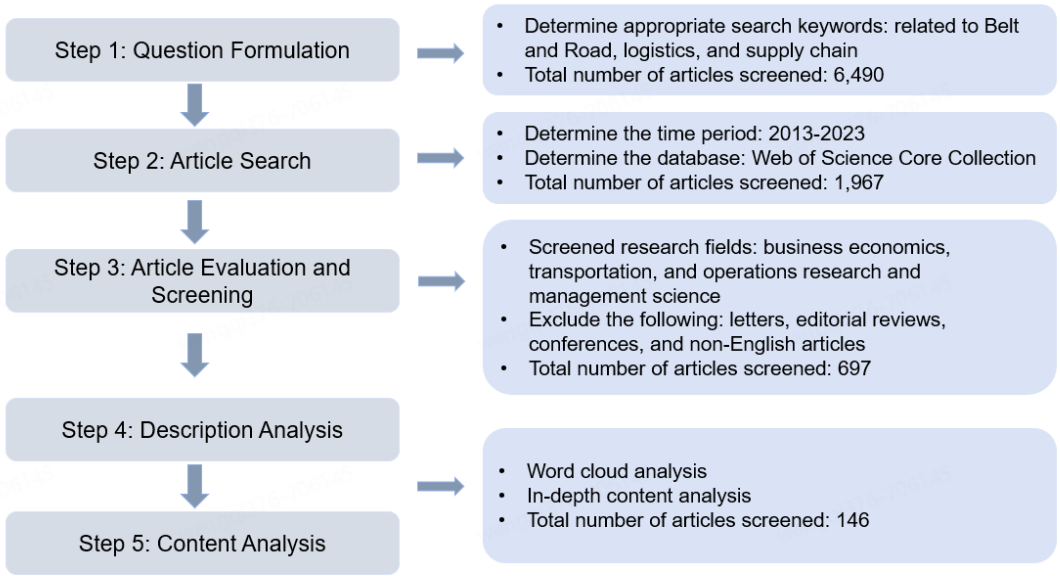


Figure 2 The five-step iterative produce for the structured literature review

2.2 Descriptive analysis

After completing the initial filtering and screening, we selected 697 articles and analyzed them macroscopically. First, the screened articles were analyzed from the perspective of publication time. Figure 3 shows the three phases of the publication trend of the Belt and Road literature in the field of logistics and supply chains from 2013 to 2023. In September and October 2013, Chinese President Xi Jinping proposed the cooperative initiatives of building the "New Silk Road Economic Belt" and the "21st Century Maritime Silk Road," respectively. Since then, the Belt and Road has become a research hotspot. In order to more fully represent the research in the field of logistics and supply chain under the Belt and Road Initiative in the past ten years, it is necessary to categorize the research progress in these ten years into time clusters.Yan et al. (2019) divided the time clusters into two-year time periods, Kong et al. (2022) divided the clusters into two time periods, 2007-2013 and 2014-2020, according to the number of articles published, and Ying et al. (2023) sorted out the promotion and effectiveness of policy communication and people-to-people communication under the Belt and Road Initiative in the past decade. In this paper, we refer to the first two methods and incorporate the perspective of the advancement of the Belt and Road agreement for the division of time clusters. Therefore, according to the advancement of the Belt and Road Agreement and academic research (represented by the number of papers published), we categorize the research related to the Belt and Road into three stages.We thus considered the period of 2013–2017 as the first stage. At this foundation stage, the number of published articles was small, and academic research was at the preliminary exploration phase. At this stage, the Belt and Road Initiative was put forward, China established the Leading Group for Promoting the Construction of the Belt and Road Initiative, and the United Nations adopted a resolution in support of the Belt and Road Initiative. At this stage, the top-level design of the Belt and Road Initiative has been gradually improved, including the implementation of the plan, the establishment of working mechanisms and the building of international cooperation platforms.The second phase, from 2018 to 2019, is the implementation phase, during which China organized the first and second Belt and Road International Summit Cooperation Forums and signed documents on the construction of the Belt and Road with more countries.At this stage, ~~The period of 2018–2019 was regarded as the system establishment stage, in which~~ China organized the first and second Belt and Road International Summit Cooperation Forums and made a new breakthrough in the economic, trade, and investment activities of the Belt and Road while shaping the business environment. The number of related studies was found to be increasing at this point. The three-year epidemic and post-epidemic period, that is, from 2020 to 2023, was considered as the third stage. This stage is considered to be the stage of high-quality development. Despite the impact of the epidemic at this stage, the construction of the Belt and Road has shown resilience and potential, and with the easing of the epidemic and the gradual recovery of the global environment, the Belt and Road has entered a new phase of development. At this stage, China has released its 14th Five-Year Plan, which promotes effective alignment and synergy between the Belt and Road Initiative and regional and international development agendas, and the construction of the Belt and Road has entered a safer and more sustainable phase. Herein, the non-financial outward foreign direct investment of the Belt and Road countries was growing rapidly against the trend, and the trade of the countries along the route was growing. At the same time, the number of related research continued to rise, with more than half of the studies being

published at this stage. However, under the influence of the successive launch of competing strategies and the war of public opinion between China and foreign countries, the academic research on the Belt and Road revealed a negative phenomenon of coldness within China and distortion in the international arena, with the selection of topics and contents being limited to individual subjects or specific projects, such as those in some African countries. The number of studies related to the Belt and Road and the logistics and supply chain field decreased significantly in 2023, hence the need for the improved innovation and sustainability of overall research. Table 2 shows the top 10 journals and the total number of publications related to the Belt and Road in the past 10 years. The top three journals are Sustainability, International Journal of Drug Policy, and Maritime Policy Management. However, the focus of the International Journal of Drug Policy is not in line with the theme of this study; thus, this journal was deleted from the set. The updated set of top 10 journals and the total number of publications related to the Belt and Road in the past 10 years are shown in Table 3.

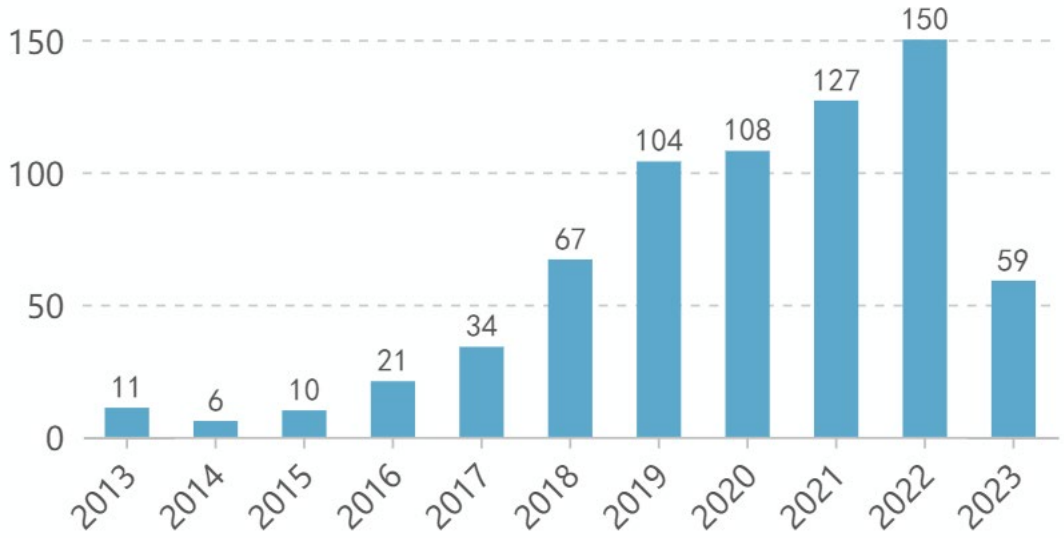


Figure 3 The number of papers on B&R in 2013–2023

Table 2 Top 10 journals in terms of published B&R-related articles in 2013–2023

Journal	Total
Sustainability	51
International Journal of Drug Policy	24
Maritime Policy Management	22
Accident Analysis and Prevention	22
Transportation Research Part E Logistics and Transportation Review	21
Environmental Science and Pollution Research	20
International Journal of Shipping and Transport Logistics	15
Journal of Geographical Sciences	15
Transport Policy	13
Transportation Research Part A Policy and Practice	11

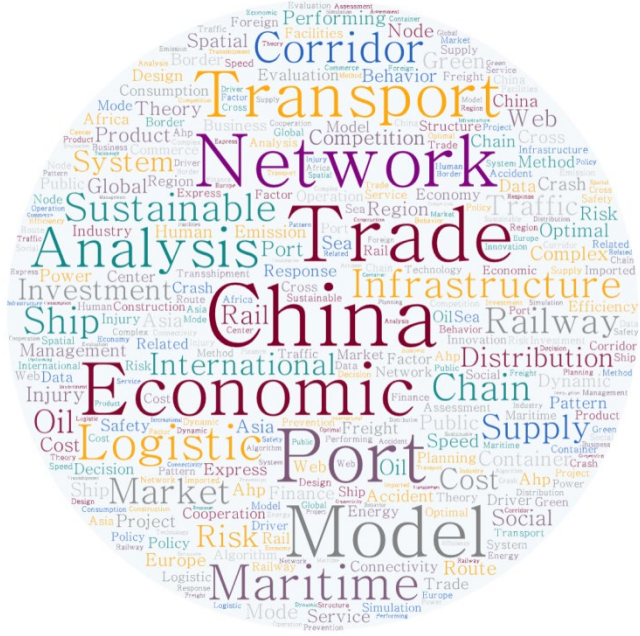
Table 3 Top 10 journals by volume of B&R-related articles published 2013-2023 (excluding less relevant journals)

Journal	Total
Sustainability	51
Maritime Policy Management	22
Accident Analysis and Prevention	22
Transportation Research Part E Logistics and Transportation Review	21
Environmental Science and Pollution Research	20
International Journal of Shipping and Transport Logistics	15
Journal of Geographical Sciences	15
Transport Policy	13
Transportation Research Part A Policy and Practice	11
Ocean Coastal Management	10

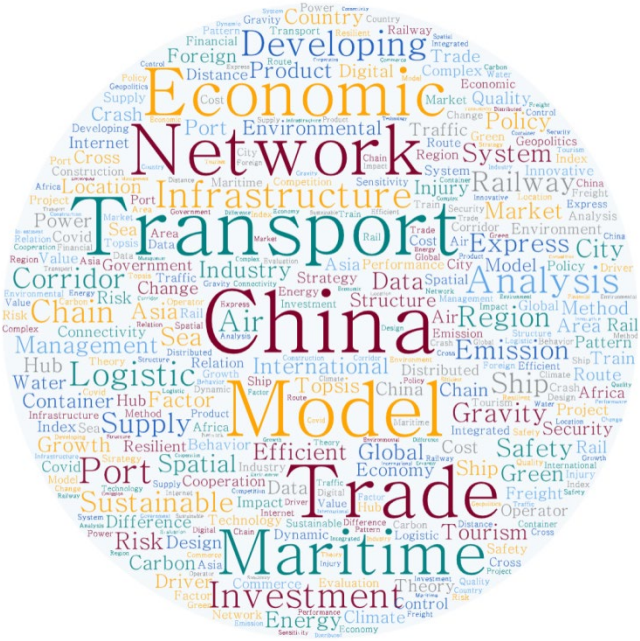
To deeply analyze the development trend of Belt and Road-related research hotspots in the past decade, we conducted a keyword analysis of the screened literature and drew a word cloud map to illustrate the frequently occurring keywords. We clustered the selected articles according to the three time periods of 2013–2017, 2018–2019, and 2020–2023. The word cloud map is shown in Figure 4, where the size of the words is proportional to their frequency. To ensure the clear display of the results, we excluded from the illustration the actual topics of this study, that is, the phrases “One Belt One Road” and “Silk Road.”



(a) cluster 1:2013–2017



(b) cluster 2:2018 – 2019



(c) cluster 3: 2020 – 2023

Figure 4 Word cloud map - most frequent keywords appeared in the selected articles

First, we noticed that “China,” “trade,” and “transportation” were the core key words of Belt and Road-related research in the field of logistics and supply chain. On the one hand, the initiator of the Belt and Road is China; hence, the research angle naturally starts from China. On the other hand, trade and transportation are also key issues involved in the Belt and Road.

Second, the research theme of each stage also changes over time. In the time period from 2013 to 2017, the BRI was still in the exploratory stage, and scholars were more concerned about the market situation, drivers, risks, and security of the Belt and Road. From 2018 to

2019, the construction of the Belt and Road was at the stage of institutional establishment, shifting from the “freehand brushwork” of planning and layout to the “brush painting” of meticulous cultivation, leading to high-quality development (Tang et al. 2019). Accordingly, scholars paid close attention to the trade exchanges, economic benefits, and infrastructure construction brought by the Belt and Road, and the research trend changed from qualitative analysis to increased focus on port planning, network design, and modeling analysis. After 2020, the COVID-19 pandemic swept the world, causing great impact on global trade. Meanwhile, the trade along the Belt and Road demonstrated great resilience and vitality, growing against the trend in the sluggish global trade environment. To study or safeguard supply chain resilience, scholars paid attention to the design of hub networks, investment in supporting infrastructure construction, and security.

2.3 Content analysis

After the descriptive statistical analysis, we conducted an in-depth content analysis of the screened articles for further screening. In this step, we screened the articles in two dimensions: paper quality and relevance to the topic. In terms of paper quality, we relied on the Academic Journal Quality Guide published by the Association of Business Schools (ABS) in the United Kingdom and only retained the articles within the ABS (2021) and ABS (2018) journal catalogs. In terms of relevance, the research team independently completed a full-text reading of the screened articles, retaining only those whose full text was closely related to the Belt and Road and removing those that only used the Belt and Road in a small scale (e.g., one of the influencing factors, one of the measures, or one of the contexts of the article). After screening for both dimensions, we collected 146 articles. Before the content analysis, we collected 697 articles, but some of these articles are not deep enough and precise enough, or only partially related to the topic of this paper, but these articles also reflect the research hotspots and research trends in this field, and the amount of literature is more abundant, and the keywords obtained by starting from these articles for descriptive analysis are more universal and complete. However, for content analysis, we needed articles with more precise content as well as a high level of quality to support our research framework, so as to explore more meaningful research opportunities, and therefore needed to screen the articles for quality as well as relevance to the topic, which resulted in 146 articles for the in-depth summarization of the later articles. Table 4 shows the data sources identified by our screening, their ABS rankings, and the number of selected articles. To highlight the journals with the highest number of selected articles, we only listed those that published at least three of the selected articles. The journals that published less than two of the selected articles were placed in another column.

Table 4 Identified journals with their ABS rankings

List of Journals	ABS Ranking（2021）	ABS Ranking（2018）	Number of Articles Selected
Transportation Research Part E: Logistics and Transportation Review	3	3	20
Maritime Policy and Management	2	2	18
International Journal of Shipping and Transport Logistics	1	1	11
Transportation Research Part A: Policy and Practice	3	3	11
Accident Analysis and Prevention	3	3	5
International Journal of Logistics Research and Applications	1	1	5
Journal of Development Economics	3	3	5
International Journal of Logistics Management	1	1	5
Maritime Economics and Logistics	1	1	5
Asia Pacific Business Review	1	2	4
Transport Reviews	1	2	4
Journal of Cleaner Production	2	2	3
China and World Economy	1	1	3
Cambridge Journal of Regions, Economy and Society	3	3	3
Journal of Environmental Management	3	3	3
World Development	3	3	3
Other	-	-	28
Total	-	-	146

To better explore the scholars' research, we linked the research content of the screened articles to the impact areas involved in the BRI. Specifically, in the previous literature review, Panibratov et al. (2020) discussed five aspects of bilateral relations and trade, global value chains (GVCs), and industrial development, and Bashir et al. (2021) analyzed the hotspots from five perspectives, such as infrastructure development, sustainable development, and geopolitics. Combining the literature review of previous studies in the field of logistics and supply chain under the BRI and screening the contents of the articles, we artificially classify the research topics into five categories: transportation planning, sustainable development, global value chain development, infrastructure construction, and subjective governance, so as to build a complete and relatively comprehensive analytical framework on the basis of a large number of readings and refinements. In the open coding process, these five categories, along with their subcategories, served as the main axes. Considering the golden circle rule of "why–what–how," we summarized the issues in global logistics and supply chain development under the BRI based on the five main categories. As shown in Appendix, we grouped the content of the selected articles according to the five categories.

Subsequently, in order to visualize the categorization, we performed counting and simple

division operations on the table showing the categorization in the Appendix, and identified the research gaps by describing the proportion of discussions on each element of "Why-What-How" in each of the five categories across all the selected articles (Figure 5). As shown in Figure 5, blue stands for transportation planning, green for sustainable development, yellow for global value chain development, red for infrastructure development, and grey for subjective governance, and shades of the same color indicate the frequency of discussion. Most of the selected articles do not limit their discussion to a single issue, focusing instead on a combination of issues, such as how the BRI affects the development of the global value chain and how the effect is resisted through subjective governance. Meanwhile, we noted the relatively limited research on the barriers to infrastructure development and the reasons for the advancement of subjective governance in logistics and supply chain development under the BRI, including its corresponding theoretical contributions. We also observed a large number of articles focusing on the why and how transportation planning, infrastructure development, and subjective governance can contribute to the advancement of the global value chain in logistics and supply chain development under the BRI.

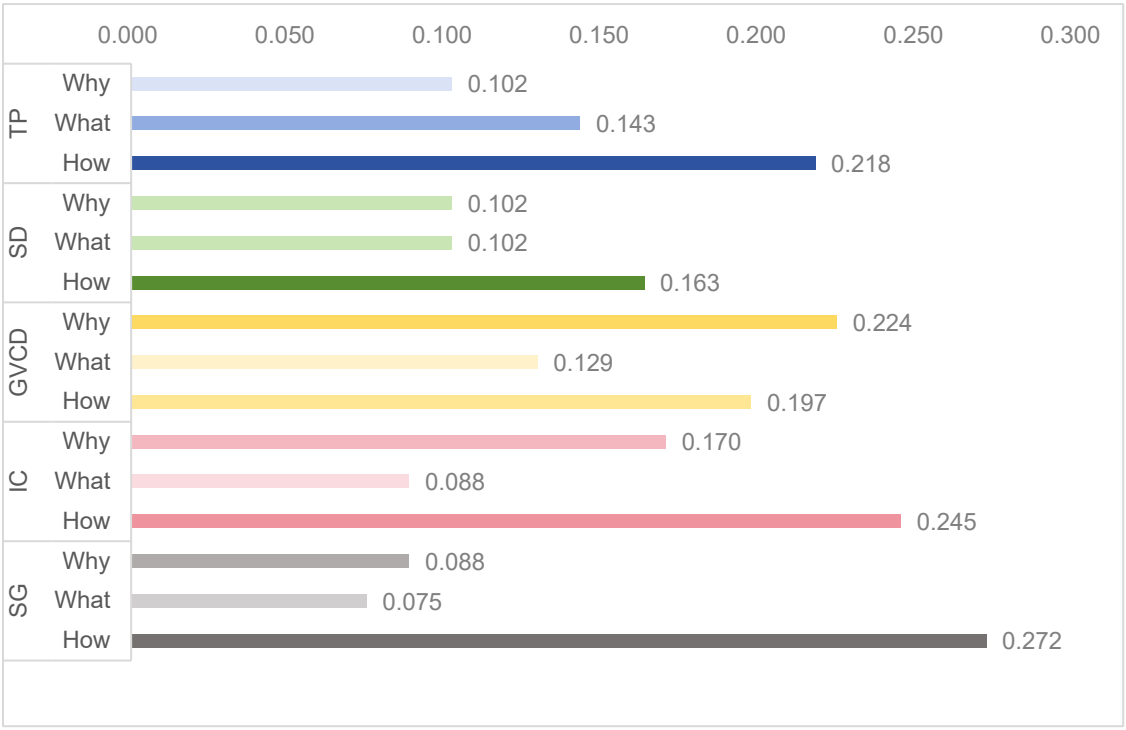


Figure 2 Proportion of research on each element of B&R in the selected articles

3 Challenges: review of logistics and supply chain construction under the BRI

Through an in-depth content analysis of the screened literature on logistics and supply chain construction under the BRI and based on the logic of "why–what–how," we summarize the issues in global logistics and supply chain development during the last decade of the BRI and further discuss the challenges ahead and research opportunities, with a focus on the five aspects mentioned previously.

In recent years, under the BRI framework, a sea and land corridor has been constructed to link the two major economic circles of East Asia and Europe. This step has not only revolutionized the container transport industry in Eurasia but also constructed a new supply chain based on international multimodal transport, which has become an important and crucial link to improve the global supply chain. Under the influence of the BRI, the modernization and reform of international logistics laws, systems, and procedures have also been promoted, thus providing great opportunities for global economic and trade development. However, opportunities often go hand in hand with challenges; hence, logistics and supply chain construction is naturally facing a series of challenges as geopolitics, cultural conflicts, and other issues arise.

3.1 Why should logistics and supply chain construction be promoted under the BRI?

Over the past decade, the BRI has spread from China to the world, becoming a popular international public good and a platform for international cooperation and providing a path for addressing issues in security (e.g., cybersecurity), climate change, and energy. The BRI, with its basic structure of "six corridors, six roads, many countries, and many ports," aims to increase the volume of freight transport by air, rail, and sea and to promote the development of commercial trade and the manufacturing industry in countries where the Initiative is being built. Therefore, the BRI brings great opportunities for the construction of logistics and supply chains in various aspects.

Transportation Planning: The Silk Road Economic Belt consists mainly of six economic corridors, and although the full range of transportation modes (e.g., sea, land, and air) are encouraged, railroads are the most relevant mode of transportation for the BRI (Butt and Ali 2020). Transporting goods by rail is twice as expensive as that by sea transport but four times cheaper than that by air transport (DSV 2019); therefore, rail transport has an obvious advantage over air and sea transport in terms of cost and time. The Belt and Road economic corridors also have significant advantages over traditional maritime routes. In particular, the New Eurasian Continental Bridge Economic Corridor, China–Mongolia–Russia Economic Corridor, China–Pakistan Economic Corridor, China–Central South Peninsula Economic Corridor, and four other corridors have great potential to serve as alternative routes for trade

between China and Europe, as confirmed in the study of Wen et al. (2019). Under the BRI, the demand for foreign trade has triggered the need for inland cross-border logistics networks, thereby stimulating the rapid expansion of new cross-border logistics networks based on dry ports in China's inland regions (Wei and Dong 2019) and increasing the focus on multimodal transportation. The Maritime Silk Road complements the mesh of the rail network as a maritime transportation route (IRU 2017). Despite the interdependence of rail and sea routes, local economies would benefit more from the BRI if operators providing both services could compete with one another (Randrianarisoa and Zhang 2020).

Sustainable Development: The contribution of the BRI to sustainable development is multifaceted. From an input perspective, the environmental quality of Belt and Road countries can be significantly improved through investments, employment structures, and clean energy (Zhou et al. 2022). Owing to the technology spillover effect of overseas investment in regions along the Belt and Road, as well as in technology-intensive and non-resource-intensive industries, reverse technology spillovers can significantly reduce energy intensity (Zhang et al. 2022) and improve the effectiveness of energy services (Lin and Chen 2020). From an output perspective, the BRI makes the development of green economy more robust. I n this way, the BRI not only helps participating countries to realize the benefits of green economies of scale (Lee and Roh 2023), reduce the carbon intensity of Belt and Road countries (Wu et al. 2021), and alleviate overcapacity concerns (Cui and Song 2018) but also exerts exerting significant progressive impact on the ninth sustainable development goal (industry, innovation, and infrastructure) (Senadjki et al. 2022), the achievement of which is deemed to be driven by the development of transportation infrastructure (Nazneen et al. 2021).

Global Value Chain Development: Since the introduction of the BRI, China has emerged as the core of the trade network among BRI countries (Damoah et al. 2022). Numerous scholars have studied China's trade competitiveness in global value chains. The implementation of the BRI contributes to strengthening China's outward direct investment (Wang and Tian 2022), with varying degrees of influence from economic, logistical, energy, and political factors (Liu et al. 2022). As one of the leading economies in Asia, China has an outward direct investment that significantly promotes industrial structure upgrades in the Belt and Road countries (Wang and Zhong 2021). Globally, the BRI may alter trade and investment trends in Indonesia (Negara and Suryadinata 2021), synergize with the development agenda in Africa (Ndzendze and Monyae 2019), and lead to asymmetric benefits for China, Russia, and Southeast Asian countries (Kohl 2019). Beyond the national perspective, scholars have also focused on trade cooperation and related behaviors. Financial integration, people-to-people ties, policy coordination, infrastructure connectivity, and smooth

trade flow have been identified as five favorable factors for enhancing logistics cooperation and service levels in BRI corridor countries (Wang et al. 2019). The combined policies of the BRI and free trade agreements exhibit synergistic benefits (Chen et al. 2021). Additionally, BRI countries that use time-sensitive inputs and are highly exposed to new infrastructure while integrating into global value chains experience greater trade benefits (Baniya et al. 2020).

Infrastructure Construction: China's BRI represents the most ambitious infrastructure development and investment strategy (Rehman 2022). Under the driving force of the BRI, significant changes have occurred in the development of port systems, including narrowing gaps between ports, hinterland expansion through inland traffic nodes, and a closer relationship between foreland and hinterland (Wang et al. 2018). As part of the 21st Century Maritime Silk Road, the Kra Canal is expected to exert a profound impact on the development of shipping networks and hub ports (Zeng and Wang 2017). Chen and Yang (2018) developed a port cluster system optimization model to study the targeted growth issues of port clusters in the context of manufacturing relocation. However, infrastructure research extends beyond ports, with Anastasiadou (2019) discussing economic regionalism within the context of the United Nations Economic Commission for Asia and the Far East and the resulting transnational infrastructure projects, particularly focusing on railways, road networks, and telecommunications infrastructure. Overall, the BRI is anticipated to enhance the quality of logistics infrastructure and significantly impact the debt vulnerability, trade, and economy of BRI countries. More than half of the recipient countries of BRI investments may experience increased debt vulnerability in the medium term (Bandiera 2020). If trade and infrastructure cooperation are mutually reinforced, trade costs will be effectively reduced, and gains from trade will increase (Wang et al. 2018; Soyres and Mulabdic 2019; Baniya et al. 2020). In addition, economic growth can be achieved through improved transportation infrastructure (Shurong et al. 2022; Rehman 2022), although the impact of transportation infrastructure levels on economic growth varies across different geographical regions (Wang and Lim 2020).

Subject Governance: Under the new trade routes of the BRI, port systems have experienced a cyclic "dispersion–aggregation–dispersion" process, gradually evolving toward a "spindle-shaped" or "olive-shaped" structure (Zhang et al. 2023). For investors, the growth in container trade implies an increased demand for large container ships, thus posing challenges in reasonably assessing terminal capacity and making investments (Yap 2019). As China shifts its economic focus from export-oriented to domestic demand-oriented growth, improvements in domestic accessibility are beneficial for inland producers to increase exports

(Xu 2016). For governments, actively deploying infrastructure construction, building sound bilateral trade relations, and developing cooperative relationships with other countries are of great significance. For instance, Kazakhstan should identify and seize the ideal opportunities provided by the BRI to cooperate with China and other economies to address common developmental issues (Wang et al. 2019). For enterprises, as transport links between China and third-party countries strengthen and more bilateral trade agreements are signed, airlines in the BRI regions have established interconnected electronic aviation service systems that provide connectivity to other geographically dispersed airlines (Huo et al. 2019). Meanwhile, Chinese companies are increasingly favoring conditions that allow the relocation of production facilities and logistics centers to lower-cost regions (Butt and Al 2020).

3.2 What obstacles will countries face when promoting logistics and supply chain construction?

In the previous section, we recognized the importance of advancing logistics and supply chain construction under the BRI. However, owing to the vast scale and complex network of the BRI, the construction of logistics and supply chains will undoubtedly face obstacles such as geopolitical issues and cultural conflicts.

Transportation Planning: Obstacles in transportation planning are primarily manifested in safety risks and efficiency redundancies. On the one hand, maritime bottlenecks include natural limitations, capacity constraints, and shipping distances (Pan et al. 2020), along with persistent risks of pirate attacks, terrorism, and accidents (Jiang and Lu 2022). The development of railway lines is significantly impacted by unconventional events such as the COVID-19 pandemic (Czerewacz-Filipowicz 2022) while road transport needs to consider factors that induce traffic accidents for long-haul truck drivers, including safety climate, driver training, and driving behavior (Chen and Sieber 2015). Therefore, numerous scholars have focused on developing strategies to address the safety risks in transportation. Wan et al. (2021) established a recovery strategy effectiveness index based on the performance–cost ratio for container shipping network interruptions. Jiang et al. (2019) proposed a Bayesian network-based model for analyzing maritime accident risks along the Maritime Silk Road, identifying factors such as location, vessel type, speed, and vessel age as significant contributors to accident occurrence. On the other hand, challenges such as redundant planning in seaports, low load rates in railways, and weak logistics functions in inland areas hinder the construction of logistics and supply chains under the BRI. Therefore, the key nodes in rapid railway transportation, particularly in major ports, must be prioritized (Zhang et al. 2020). Additionally, studying other convenient air–rail intermodal connections from a multimodal perspective can alleviate the imbalance in air connectivity distribution between central and

non-central cities (Wang and Jiang 2020).

Sustainable Development: With the increase in low-frequency and highly destructive events such as natural disasters in recent years, safety research has shifted its focus from traditional risk-based methods to safety-based methods, and sustainability has become a key in resilience discussions (Wan et al. 2017). As the largest international cooperation platform in contemporary times, the BRI may have negative impacts on sustainable supply chains, leading to higher pollution, overuse of raw materials, and increased risks of water, energy, and food resource pressures (Qian et al. 2020). As focus on the energy supply chain increases, the export of energy-intensive products may accelerate energy outflow, causing further environmental deterioration. Kazakhstan, as a key supporter and energy-exporting country under the BRI, faces significant pressure for carbon dioxide reduction and green development (Wang et al. 2019). Therefore, environmental protection must be strengthened, and green supply chain management must be introduced while advancing the BRI (Cui and Song 2018).

Global Value Chain Development: Under the BRI, the tension in political situations between partner countries and the vast scale involving over 70 countries make supply chain risk management incredibly complex. Moreover, external information and environmental interweaving add another layer of potential risks, thus challenging resilience construction in international supply chains (Butt and Shah 2020; Ram and Zhang 2020). In terms of trade barriers, the agricultural trade between the European Union and China faces the risk of shifting (Fang and Shakur 2018). The global outbreak of COVID-19 has resulted in unprecedented economic losses and supply chain disruptions, including entry bans, trade blockades, and global protectionism, which are unfavorable for the development of global value chains (Cheong et al. 2022). In terms of cooperative relationships between partner countries, a complete consensus and goals have not been established. Countries such as India and Pakistan have drastically different attitudes toward the BRI (Jacob 2017). Additionally, some countries with internal instability and severe political polarization tend to shift the burden of responsibility to economically and politically stable countries, leading to imbalances in risk-sharing partnerships (Ram and Zhang 2020). Pu et al. (2020) studied the issue of mismatch in assembly supply chains under the BRI and proposed repurchase contracts to induce credible vertical information sharing and better supply–demand matching.

Infrastructure Construction: Infrastructure construction faces obstacles in three ways. First, because ports are crucial elements supporting the connectivity of the Maritime Silk Road shipping network, effective safety assessments of ports must be conducted. However, traditional quantitative risk analysis methods face challenges owing to the incompleteness and fuzziness of risk data and the uncertainty of operations and the environment. To address this

issue, Jiang et al. (2021) integrated fuzzy set theory, evidence reasoning, and expected utility theory and proposed a new safety assessment method. Second, with the increasing transportation demand under the BRI, policies such as relaxing coastal transportation may negatively impact the quality of freight services (Li et al. 2020) and weaken the functions of some transshipment transportation hubs (Wong et al. 2019). Moreover, managing and maintaining the BRI infrastructure poses significant challenges. Particularly in remote areas, businesses may struggle to access resources to restore the normal functionality of infrastructure after sudden destructive events. Even without such events, infrastructure may erode slowly, eventually affecting road and railway networks (Butt and Shah 2020).

Subject Governance: As the BRI promotes the expansion of freight operations, joint ventures or mergers between international transportation companies have become increasingly complex. In particular, these collaborations involve cultural risks between different countries, including differences in religions, organizational forms, and worldviews, potentially leading to conflicts in negotiations, cooperations, and investments between governments and large transportation enterprises (Yin and Chen 2020). However, in such an environment, cross-cultural management skills and the construction of cross-cultural networks are often overlooked. Particularly, in the logistics and supply chain field, joint ventures or merged companies must pay attention to the coordination difficulties brought about by cultural differences, including transportation processes, cargo handling, and the various aspects of cross-border cooperation. Similarly, domestic companies and banks also face challenges. With the progress of the BRI and the mixed ownership reform of state-owned enterprises, large enterprises may form horizontal industry alliances. However, such collaborations could lead to bankruptcy crises for small and medium-sized enterprises. Therefore, in logistics and supply chains, particular attention must be paid to risk management for small and medium-sized enterprises to ensure that they are not marginalized during collaborations (Liu et al., 2023c). Owing to the continued dominance of Chinese banks as a result of relaxed restrictions, non-Chinese banks may struggle to access sufficient financing. This issue could impact the cash flow and business expansion of multinational freight companies and potentially prevent them from meeting adequate environmental standards (Butt and Ali 2020).

3.3 How should logistics and supply chain construction be promoted under the BRI?

The BRI has made an irreplaceable contribution to the significant development of the global container shipping industry, and the construction of logistics and supply chains is necessary to ensure the high-quality co-construction of the BRI. Therefore, in the face of various obstacles, research must be conducted from multiple perspectives and entities to

promote the future development of logistics and supply chains.

Transportation Planning: With the deepening of the BRI, freight networks become increasingly important. Cost, time, and reliability are key indicators for enterprises to choose freight modes (Li et al. 2020). In terms of cost, appropriate government subsidies to freight transport operators can effectively reduce freight transport costs (Jiang and Sheu 2018) while the investment pricing decision model for logistics nodes such as ports can be established by combining the principle of site selection with the lowest cost in a broad sense (Chen and Yang 2017). Time can be understood as the efficiency of transportation, which is related to the transportation performance of transportation routes, distribution capacity of distribution nodes, and mode of multimodal transportation. In improving transportation efficiency under the complex freight transportation network of the BRI, efforts must be exerted toward fully understanding the relative operational efficiency of key ports, ranking the importance of each logistics node in the freight transportation network in combination with indicators such as cargo throughput, and calculating the attractiveness of different transportation corridors so as to provide information for transportation planning and port operations in the context of the Belt and Road strategy (Li and Zhao 2018; Zhao et al. 2020; Huang and Chen 2020; Ghasemi et al. 2020). In eliminating bottlenecks caused by transshipment and improving transportation efficiency, the intermodal modes of train ferries can also be used, and multiple intermodal routes should be evaluated and analyzed (Choi et al. 2019). Reliability tends to focus on safety and resilience in the transportation sector. Wan et al. (2017) articulated the question of resilience in the transportation sector, providing useful solutions to the problem of constructing and managing resilience. Yannis and Weijermars (2013) developed a set of road network safety performance indicators as a benchmark for cross-regional comparisons. However, from the perspective of forecasting, reliability can also be interpreted as accuracy. Lu et al. (2020) proposed a path selection method based on a nested logit model and a time–space network to improve the forecasting accuracy of air passenger flows under multimodal transportation modes.

Sustainable development: Sustainable development refers to the realization of a win–win situation in terms of both profitability and environmental sustainability. In terms of profitability, companies must actively utilize cooperative competition strategies, open innovation, and digital capabilities to achieve sustainable performance under the BRI (Lee and Roh 2023). In addition, they must promote the sustainable development of important resources, such as ports and railroads. The railroad system is a closed-loop system with low flexibility (Uygun and Ahsan 2021) while the sustainability of ports is influenced by the five dimensions of port operational capacity, economic conditions, environmental factors, human

intelligence, and technology (Haralambides 2021). Accordingly, the performance assessment of individual ports or railroads can effectively contribute to sustainable development. In terms of environmental sustainability, supply chain energy management and intersubjective environmental governance and corporate social responsibility must be considered. In the construction of logistics and supply chains, energy consumption is a factor that is not usually ignored. Thus, supply chain energy management is an consideration to promote the environmental sustainability of enterprises. To enhance energy security, the domestic energy structure can be improved by developing the renewable energy sector, and a portfolio of energy imports can be developed and optimized as much as possible (Zhang 2019). At the same time, intergovernmental institutions and the public constitute the core governance structure for the environment (Wang et al. 2020), and corporations should strengthen their social responsibility by maintaining their commitment to strict codes of conduct and implementing high standards of corporate social responsibility (Butt and Ali 2020). However, focusing on profitability and environmental sustainability alone is insufficient. Niu and Xu (2019) found that the profitability and environmental sustainability of transnational corporations in BRI countries can be reconciled when tax differences are within a moderate range. Therefore, BRI countries are encouraged to reasonably adjust their corporate income tax rates instead of greatly reducing them.

Global Value Chain Development: Under the BRI, improving the level of infrastructure and promoting the upgrading of the industrial structure of BRI countries require the further strengthening of international cooperation and expansion of outward investment (Wang and Zhong 2021). First, the expanding transportation network has reshaped the spatial organization and distance elasticity of cross-border investment, and the spatial distribution of global investment has become increasingly flat (Chen 2020). To make effective and sustainable investments under the BRI, port investment priorities must be modeled and analyzed based on an understanding of the production scale of different industries in each country through their location advantages and port network structures (Chen et al. 2021; Zheng et al. 2021). Second, in the context of the prevalent global value chain division of labor, a strong positive correlation exists between global value chain trade and bilateral economic cycle synchronization, and economic growth and trade cost reduction are the key drivers of trade expansion between China and Europe (Fang and Shakur 2018; Yu et al. 2023). An effective way to reduce the specific risks of individual enterprises, as well as the risk of disrupting the entire supply chain, is to select suppliers from multiple countries (Lei et al. 2019). As for improving trade efficiency along the Maritime Silk Road, efforts must be made to strengthen global connectivity and supply chain cooperation (Wang et al. 2018). When

selecting cooperation targets, indicators such as national labor productivity, inter-country cooperation index, national stability, and national import and export trade volumes are all used as measurement criteria (Shao and Ma 2017; Steinhauser 2023). Moreover, cooperative countries should establish preferential trade liberalization as soon as possible and improve supply chain coordination through cost-sharing contracts to gradually realize the economic integration of the entire region (Liu and Zhang 2018; Cui and Song 2018).

Infrastructure Construction: A key indicator of the effectiveness of the BRI is the establishment of an effective infrastructure network (Wang et al. 2018). Significant room for negotiation arises because of the domain-specific nature of infrastructure development and the fact that China's strategic motivations and industrial policy needs are often not aligned with the development priorities of host countries. Most Southeast Asian countries are developing economies with a huge demand for maritime infrastructure, including terminals, berths, and warehouses, and they may seek to negotiate collective infrastructure investments with China (Oh et al. 2018). The BRI should take note of infrastructure projects that have fallen into a state of disrepair and abandonment (Ndzendze and Monyae 2019) and actively promote the construction of new infrastructure, such as ports and railroads, which in turn will effectively realize the three-way interconnectivity of land, sea, and air. Ports are the centers of international trade in goods, capital, technology, talent, and information. Their competitiveness should be comprehensively assessed by considering conditions, capacity, potential, and efficiency (Peng and Yang 2018; Ren et al. 2018). Moreover, attention should be paid to the impact of different driving modes (e.g., government- and market-driven modes) and location advantages on the development of inland ports (Nguyen et al. 2019; Zheng et al. 2020) and to the improvement of the economies of scale of operations through measures such as merging some terminals (Yap 2019). For land transportation, the assessment of large-scale, cross-border, high-speed railroad construction and the planning of logistics parks are major issues that are specific to the implementation of the BRI (Shao and Ma 2017; Fu et al. 2020). In addition, by strengthening infrastructure development, an effective infrastructure network can be built to connect Asia, Europe, and Africa and shorten geographic distances, creating an opportunity for manufacturers to gain the trust of Belt and Road suppliers and ensure a timely supply of products while improving service satisfaction (Pu et al. 2020).

Subject Governance: The efficiency of implementing key BRI projects largely depends on the political environment of the host country and the strategic planning of enterprises. Political reliability is an important prerequisite for the success of the Belt and Road Economic Corridor. Governments participating in the BRI should work closely and focus on improving their internal governance structures to provide a stable and reliable political environment,

further supporting the smooth and efficient operation of cross-border transportation connectivity infrastructure and construction projects (Chia 2016; Wen et al. 2019). Governments should also implement appropriate policy measures and supportive actions to strengthen the function of inland cross-border logistics systems. On the one hand, governments can adjust the fee structure and coastal navigation rights policy (Heng and Yip 2017; Wong 2019) and provide incentives and operational support. On the other hand, governments should strategically design subsidy mechanisms, increase financial support for renewable energy promotion, and increase the central government regulation of local government investment while giving full play to the market mechanism and encouraging local firms to carry out overseas investment activities to obtain reverse technology spillover effects (Kundu 2019; Zhang and Li 2022; Zheng et al. 2022). However, focusing solely on governments' macro control is not sufficient; the governance strategies of enterprises must also be implemented. In the process of overseas expansion, relevant enterprises must establish a good monitoring mechanism in their cross-regional cooperation with all partners and make appropriate governance arrangements in the dimensions of coordination and adaptation, control and safeguarding, incentive and compensation structures, and policies and regulations (Huo et al. 2018; Li and Shou 2019). Meanwhile, to cope effectively with uncertainty, enterprises often need to pay attention to the flexibility and organizational structure of small- and medium-sized suppliers, proactively design supply chain management network systems, and adopt joint infrastructure management at the right time (Sundarakani et al. 2020; Randrianarisoa and Zhang 2020; Yin and Chen 2020).

3.4 Challenges ahead

The BRI is a long-term dynamic process, which will give rise to different challenges at different stages as the international order and landscape evolves. Ten years into the BRI, logistics and supply chain construction still face a series of future challenges. First of all, the uncertainty of international political economy has increased the difficulty of building international supply chain network. With the outbreak of Russia-Ukraine war, Israeli-Palestinian conflict and other wars, the important nodes of the BRI have suffered blows, and the Eurasian economic and trade cooperation and transportation and logistics are facing the risk of being torn apart, which will exacerbate the chaos in the global supply chain, enhance the cost of logistics, and lead to the construction of supply chain network and the rules of governance to diverge. Secondly, the game of big countries has led to huge pressure on logistics and supply chain construction under the BRI. Under the chaotic international situation, the decisions and positions of major powers such as China and the United States will greatly affect the development of the BRI as well as the logistics and supply chain

network. As the trade war between China and the U.S. continues, countries are gradually adjusting their supply chain and trade strategies under its influence, and the construction of the global supply chain under the BRI will be impacted. Finally, the accelerated evolution of the unprecedented changes has led to the nearshoreization of the entire supply chain. With the deepening of the world supply chain reshaping, the market division of labor system has been impacted, and the supply chain has shifted from the offshore layout to the nearshore layout, which will push the supply chain of the BRI co-construction industry chain passively towards the regionalized layout and affect its normal operation.

4 Opportunities: New trends on logistics and supply chain construction under the BRI

Based on the above analysis, we find that the research on logistics and supply chain construction under the BRI mainly focuses on the micro level to solve the specific problems of terminal operation, port planning, transportation planning, etc. However, few scholars have paid attention to the interaction of the state as a participant in the BRI at the macro level. As BRI countries have different political characteristics, development methods, and cultural traditions, realizing linked development lies in policy communication. As the initiator of the BRI, China, through its policies, will exert a significant impact on the development of the BRI on a global scale. Therefore, maximizing China's role in promoting the BRI, helping achieve good interaction among the Belt and Road countries, and raising the awareness of the participation of countries along the routes are important tasks.

As for emerging research themes, smart drivers have become a hot topic. With the development of information technology and the deepening of the international division of labour, the pattern of global trade is undergoing profound changes. In recent years, affected by uncertainties in the global economy, a new round of technological revolution and industrial change driven by digital technology has set off a wave of digital economy on a global scale, providing new opportunities for the construction of the existing trade transportation and supply chain based on traditional trade in goods and services. Given this opportunity, China has deepened its cooperation in innovation and science and technology with Saudi Arabia and other Gulf countries, jointly promoting big data, cloud computing and the construction of smart cities, and joining hands to build a 21st-century "Digital Silk Road". Through a review of the related literature, we found that most relevant studies have focused on improving algorithms for important nodes or transportation planning. For example, Zhang et al. (2020) calculated the importance of railroad express nodes based on constraint coefficients, such as network size, efficiency, class, and clustering coefficients, in structural hole theory and developed relevant algorithms. However, the discussion on how countries can implement these advanced technologies in complex supply chain networks and how the concept of

“Smart Customs, Smart Borders, Smart Connections” can be realized has largely been limited. The “Digital Silk Road” has brought low-cost long-distance transactions, low-cost investment and sustainable cooperative relations to participating countries, while the “Smart Customs, Smart Borders, Smart Connections” centered on intelligent construction is a pragmatic initiative for Customs to serve the high-quality development of the BRI cooperation, the study of which is still a long way to go.

The future development of sustainability in logistics and supply chain construction also deserves in-depth study. The BRI has changed the ocean-based world economic and trade patterns formed in the past three centuries by creating a new development situation in which the ocean and land economies go hand in hand. Such change has triggered the discussion on the synergistic development of these economies. However, current research has focused mainly on the level of logistics networks. In the future, attention should also be paid to the sustainable development of logistics efficiency and transportation capacity, and specific solutions (e.g., back-airing) should be proposed to address the phenomenon of resource wastage in logistics transportation.

Additionally, under the BRI, maintaining the resilience and stability of the global industrial supply chain is important for promoting the development of the world economy. As an increasing number of countries focus on the development of supply chain resilience and the corresponding security issues, supply chain resilience will become more visible, transparent, recognizable, and evaluable and may thus raise new research questions regarding the development of global supply chain resilience in terms of network design, technological innovation, and infrastructure construction. At the same time, effectively enhancing supply chain resilience by improving weak links in logistics, engaging in proactive planning before supply chain disruptions, and implementing recovery strategies after supply chain disruptions are all issues that need to be studied more deeply in the future.

Based on the analysis, we summarize potential future research directions and draw the research agenda, as shown in Table 5.

Table 5 Proposed agenda for logistics and supply chain research works under the BRI

Potential research direction	Focus	Research Questions	Potential Methodology
How to maximize China's role in promoting the Belt and Road Initiative?	Subject interaction	• How will China's Belt and Road policies affect the geopolitical landscape of participating countries and regions? • How does China, as a major power, formulate policies to help achieve good interaction among the Belt and Road countries? • How to improve the awareness of participation of countries along the Belt and Road and achieve the same frequency resonance of the economy along the line?	• Case studies • Conceptual framework
In the face of the future digital economy, how to increase the application of advanced technologies in logistics and supply chain construction to achieve intelligent driving?	Intelligence driving	• What role does digitization and technological innovation play in optimizing trade and logistics networks? • How can big data analytics and IoT be used to optimize inventory management, demand forecasting and resource planning in the supply chain? • How can digital payments and financial services facilitate the convenience and security of cross-border trade? • How to implement the cooperation concept of "Smart Customs, Smart Borders, Smart Connections"?	• Mathematical modelling • Empirical analysis • Experimental design • Simulation
How can the marine economy and the land economy achieve coordinated development under the BRI?	Sustainable development	• What is the mismatch or conflict in the policy framework of marine economy and land economy development, and how to achieve coordination and complementarity between the two? • How to realize the efficient connection of land and sea trade in terms of port construction and cross-sea transportation ? • How to balance the development of marine economy and land economy to ensure sustainability and environmental protection? • How to avoid environmental pollution and ecological damage in the development of marine resources and land industry?	• Case studies • Conceptual framework • Mathematical modelling
How to achieve sustainable development under the BRI by improving logistics		• How to improve the efficiency and capacity of transport infrastructure such as ports, railways and roads?	• Mathematical modelling • Empirical analysis

efficiency and transportation capacity?		• How can multimodal transport improve logistics flexibility and efficiency? How to promote the synergistic development between different modes of transport? • How to reduce the waste of resources in logistics transportation such as return empty phenomenon? • How to balance the relationship between economic benefits and supply chain stability?	
How to achieve the security and stability of industrial chain and supply chain from a global perspective under the BRI?	Supply chain resilience construction	• How to balance supply chain diversification and cost-effectiveness on a global scale? • How to plan ahead of supply chain disruption? • How to quickly adopt a recovery strategy after a supply chain disruption?	• Mathematical modelling • Empirical analysis • Simulation

5 Conclusion

The Belt and Road, as a sea and land corridor connecting Asia, Europe, Africa, and Latin America, has attracted increasing attention from the international community and academia as it provides a rich base of research cases and scenarios. We begin with a structural literature review describing the progress of research on logistics and supply chain construction under the BRI. Based on the descriptive analysis, we propose three cloud diagrams to capture the trends in research hotspots. Then, through a careful review and in-depth analysis from a problem-oriented perspective, we develop a research framework in five categories, namely, transportation planning, sustainable development, global value chain development, infrastructure construction, and subject governance, by mapping the content of the articles to the impact areas involved in the BRI. On the basis of this research framework, we show the challenges of building logistics and supply chains under the BRI. Following the "why–what–how" logic, we also identify and summarize the advantages, obstacles, and facilitation measures for the development of global logistics and supply chains based on the BRI in the period of 2013–2023 and present future challenges. Finally, according to the analysis, we summarize the research opportunities for further advancing the topic and then draw the research agenda.

In future research on logistics and supply chain construction driven by the BRI, four aspects deserve special attention. First, it's necessary to research on how China can maximize its role in promoting the BRI and increase the participation of countries along the route from the macro perspective of policy and subject relationship. Second, digital technology has introduced a new round of scientific and technological revolution and industrial change, and the ways to implement advanced technology in the complex supply chain network and practice the cooperation concept of "Smart Customs, Smart Borders, Smart Connections" are worth studying in depth. Third, the BRI has created a new development situation in which the maritime and land economies go hand in hand. This change raises the question of how the two economies can be synergistically developed and how logistics efficiency and transportation capacity can be enhanced for sustainability. Finally, as supply chain resilience becomes more visible, transparent, identifiable, and evaluable, further refinement is needed with regard to improving weak links in logistics through network design, technological innovation, and infrastructure construction; engaging in proactive planning before supply chain disruptions, and implementing reactive recovery strategies after disruptions in the supply chain.

Although this study makes some theoretical and practical contributions, it has certain limitations. First, the problem of systematic literature reviews with regard to their heavy reliance on inclusion criteria remains. Second, although we believe that we sorted all

pertinent studies using a relatively feasible method, we still could have missed some studies, especially those that are not archived in the WOS Core Collection. Therefore, future research can aim to expand universality and shed more light on the development of logistics and supply chains under the BRI.

Notes: This data is retrieved from the physical addresses of all authors listed in the publication.

Appendix：Mapping of the selecting articles

No.	Author（year）	Problem-oriented														
		TP			SD			GVCD			IC			SG		
		Why	What	How	Why	What	How	Why	What	How	Why	What	How	Why	What	How
1	Lim and Li (2021)												√			√
2	Uygun and Ahsan (2021)	√		√			√									
3	Wei and Lee (2021)					√										√
4	Carrai (2021)				√											√
5	Haralambides (2021)						√									
6	Butt and Shah (2020)								√		√	√				
7	Li et al. (2020)		√	√								√			√	
8	Pu et al. (2020)								√				√			
9	Ghasemi et al. (2020)			√												
10	Pan et al. (2020)		√													
11	Rehman and Noman (2020)												√			
12	Lee et al. (2020)															
13	Sundarakani et al. (2020)									√						√
14	Ram and Zhang (2020)								√							
15	Bandiera (2020)										√					
16	Lall and Lebrand (2020)							√								
17	Wang and Jiang (2020)		√										√			
18	Zhang et al. (2020)		√	√												
19	Wang et al. (2020)				√		√									
20	Baniya et al. (2020)							√			√					
21	Chen et al. (2020)									√						
22	Fu et al. (2020)												√			√
23	Butt and Ali (2020)	√				√	√							√	√	
24	Randrianarisoa and Zhang (2020)	√														√
25	Zheng et al. (2020)												√			√

26	Zhang and Schramm (2020)						√									
27	Zhao et al. (2020)			√												
28	Huang and Chen (2020)			√		√										
29	Lin and Chen (2020)				√											
30	Li et al. (2020)						√									
31	Zhou and Kim (2020)											√				
32	Wang et al. (2020)						√									
33	Wang and Lim (2020)								√	√						
34	Yin and Chen (2020)													√	√	
35	Soyres and Mulabdic (2019)								√							
36	Jiang et al. (2019)		√													
37	Choi et al. (2019)			√												
38	Nguyen et al. (2019)			√								√				
39	Lei et al. (2019)							√								
40	Wang and Chou (2019)						√					√				
41	Shao (2019)					√		√								
42	Wong et al. (2019)		√							√					√	
43	Huo et al. (2019)										√				√	
44	Wang et al.(2019)				√									√	√	
45	Kundu (2019)		√	√											√	
46	Sun et al. (2019)		√	√												
47	Li and Shou (2019)							√							√	
48	Zhang (2019)					√		√								
49	Chen and Yang (2017)			√				√							√	
50	Thürer et al. (2019)	√					√		√							
51	Wei and Dong (2019)		√									√			√	
52	Alon et al. (2018)						√					√			√	
53	Ruan et al. (2019)								√							
54	Niu and Xu (2019)					√		√								
55	Pomfret (2019)						√									
56	Anastasiadou (2019)								√							

57	Kohl (2019)						√								
58	Wen et al. (2019)	√													√
59	Chan and Reiner (2019)								√						√
60	Yang et al. (2019)				√				√						
61	Cui and Song (2018)				√	√	√		√						
62	Bartosiewicz and Szterlik (2018)		√				√								
63	Huo et al. (2018)						√	√		√					√
64	Wang et al. (2018)						√		√	√		√			
65	Ndzendze and Monyae (2019)											√			
66	Li and Zhao (2018)					√	√								
67	Peng and Yang (2018)											√			
68	Jiang and Sheu (2018)					√									
69	Yang and Jiang (2018)			√					√						
70	Zeng and Wang (2017)									√					
71	Sheu and Kundu (2017)			√					√			√			
72	Liu and Zhang (2018)								√						
73	Yang et al. (2017)			√								√			√
74	Shao and Ma (2017)								√			√			
75	To and Lee (2018)				√										
76	Li et al. (2018)						√								
77	Heng and Yip (2017)														√
78	Oh (2018)											√			
79	Wan et al. (2017)			√		√									
80	Chen and Yang (2018)									√					
81	Fang and Shakur (2018)							√	√	√					
82	Wang et al. (2018)						√			√					
83	Ren et al. (2018)			√								√			
84	Li et al. (2017)											√			
85	Wang and Yeo (2017)														
86	Wei and Sheng (2017)											√			
87	Ruan et al. (2017)											√			√

88	Herrero and Xu (2017)							√			√						
89	Fardella and Prodi (2017)										√						
90	Jacob (2017)								√								
91	Xu (2016)										√			√			
92	Chia (2016)												√				√
93	Chen and Sieber (2015)		√														
94	Yannis and Weijermars (2013)			√													
95	Castro et al. (2013)					√											
96	Ghanem et al. (2021)			√				√									
97	Lu et al. (2020)			√													
98	Zhang and Li (2022)						√										√
99	Yap (2019)				√								√	√			
100	Lo (2018)							√									
101	CHAISSE and MATSUSHITA (2018)							√									
102	Liu et al. (2023a)				√		√										
103	Steinhauser (2023)							√	√								√
104	Yu et al. (2023)							√	√								√
105	Ma et al. (2023)	√	√	√													√
106	Lee and Roh (2023)				√		√							√			√
107	Westin et al. (2023)				√	√	√										
108	Lee and Song (2023)	√	√	√			√				√	√	√				
109	Zhou et al. (2023)				√	√	√										√
110	Zhang et al. (2023)			√							√	√	√				
111	Zhang et al. (2022)					√	√										√
112	Senadjki et al. (2022)				√	√	√										
113	Damoah et al. (2022)							√	√								
114	Ashraf (2022)					√	√		√	√							
115	Yu et al. (2022)							√	√	√							
116	Qian et al. (2022)					√	√							√	√		√
117	Liu et al. (2022)												√	√	√		√

118	Wei et al. (2022)													√	√	√
119	Qi et al. (2022)	√		√		√	√									√
120	Fan et al. (2022)				√		√	√	√	√						
121	Huang et al. (2022)	√		√										√	√	√
122	Mukhtar et al. (2022)															
123	Zhao et al. (2022)										√	√	√			
124	Rehman (2022)										√	√	√			√
125	Katarzyna (2022)	√	√	√										√	√	√
126	Beule et al. (2022)															
127	Wang and Tian (2022)							√	√	√						
128	Jiang and Lu (2022)		√	√							√	√	√			
129	Zheng et al. (2022)	√	√	√												
130	Wieczorek and Ignaciuk. (2022)	√	√	√												√
131	Cheong et al. (2022)							√	√	√					√	
132	Emmanuel (2022)							√	√	√				√		
133	Yang et al. (2021)		√	√												
134	Zheng et al. (2021)								√	√		√	√			
135	Nazneen et al. (2021)				√	√	√									
136	Saeed et al. (2021)								√	√	√	√	√			
137	Wu et al. (2021)				√	√	√									
138	Mohammadi et al. (2021)	√	√	√												
139	Jiang et al. (2021)										√	√	√			
140	Zhou et al. (2021)	√	√	√									√			
141	Negara and Suryadinata (2021)							√		√				√		√
142	Jackson (2021)							√						√		
143	Chen et al. (2021)	√	√	√												
144	Ali et al. (2021)							√	√	√						
145	Chen et al. (2021)								√	√		√	√			
146	Wang and Zhong (2021)							√		√	√		√			

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